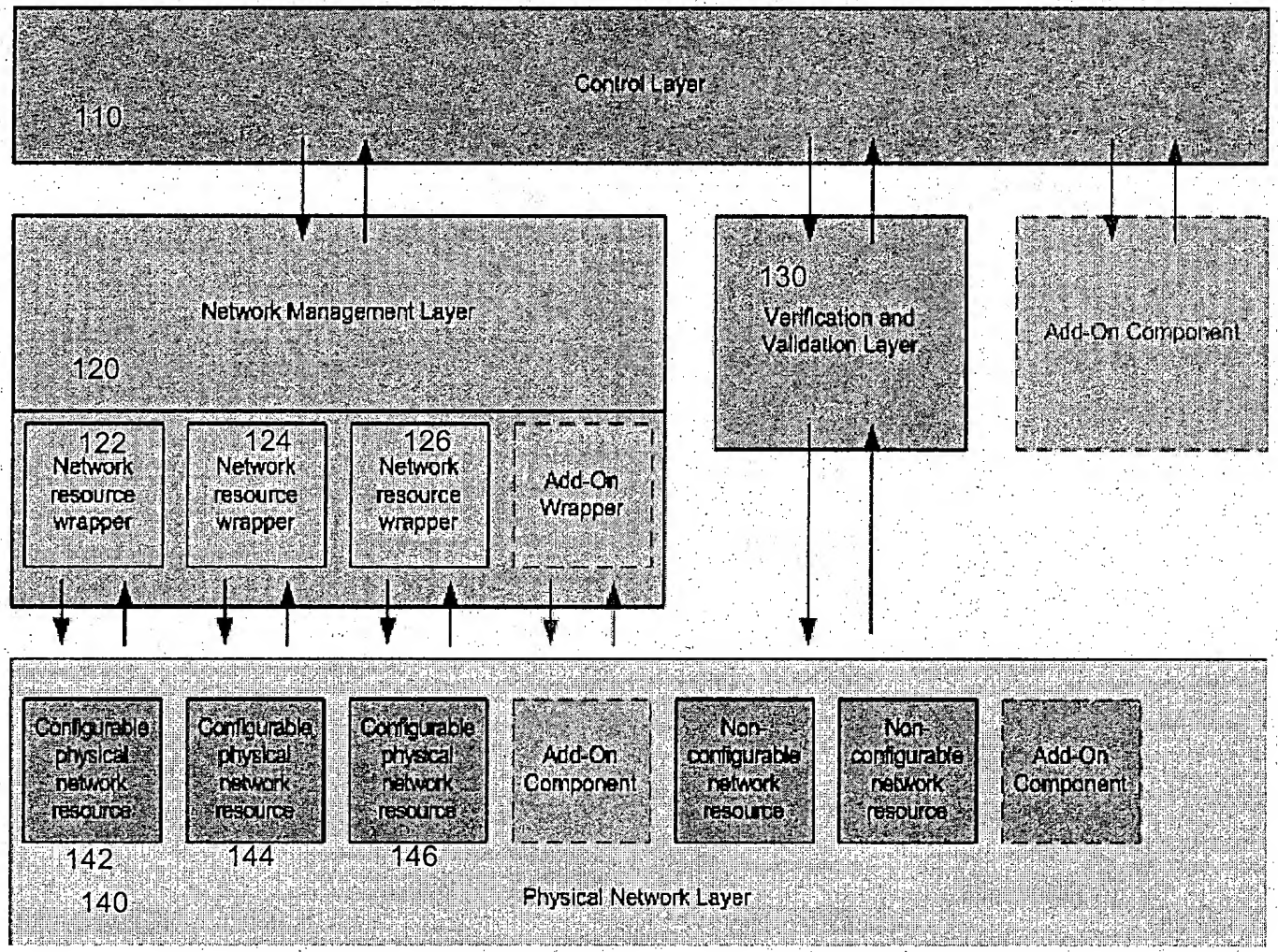
Control Layer
110
Network Management Layer
120
130
Verification and Validation Layer
Add-On Component
122
Network resource wrapper
124
Network resource wrapper
126
Network resource wrapper
Add-On Wrapper
Configurable physical network resource
Configurable physical network resource
Configurable physical network resource
Add-On Component
Non-configurable network resource
Non-configurable network resource
Add-On Component
142
144
146
140
Physical Network Layer

100

FIG. 1

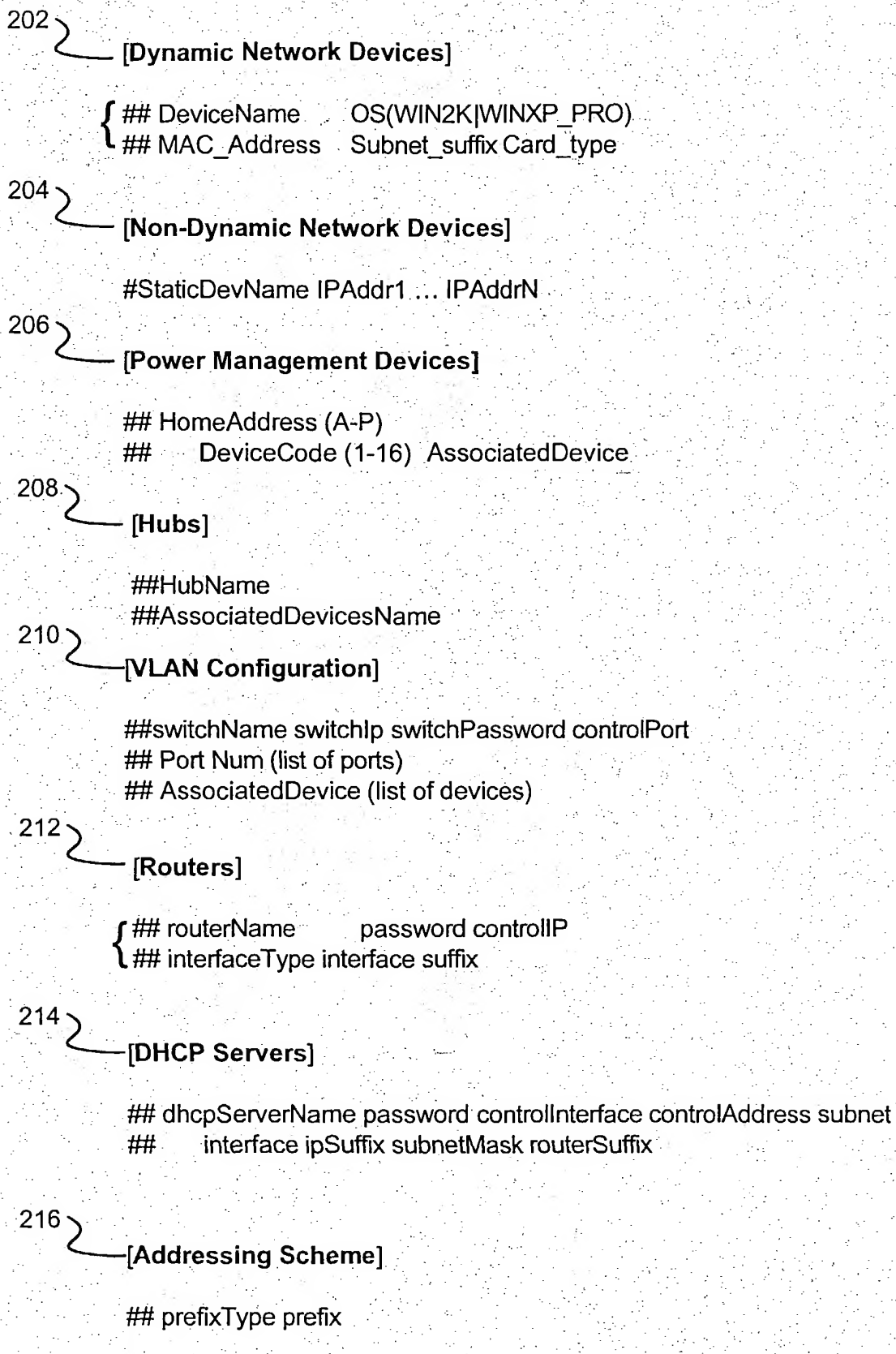
202
[Dynamic Network Devices]
DeviceName OS(WIN2K|WINXP_PRO)
MAC_Address Subnet_suffix Card_type
204
[Non-Dynamic Network Devices]
#StaticDevName IPAddr1 ... IPAddrN
206
[Power Management Devices]
HomeAddress (A-P)
DeviceCode (1-16) AssociatedDevice
208
[Hubs]
##HubName
##AssociatedDevicesName
210
[VLAN Configuration]
##switchName switchIp switchPassword controlPort
Port Num (list of ports)
AssociatedDevice (list of devices)
212
[Routers]
routerName password controlIP
interfaceType interface suffix
214
[DHCP Servers]
dhcpServerName password controlInterface controlAddress subnet
interface ipSuffix subnetMask routerSuffix
216
[Addressing Scheme]
prefixType prefix
200

FIG. 2

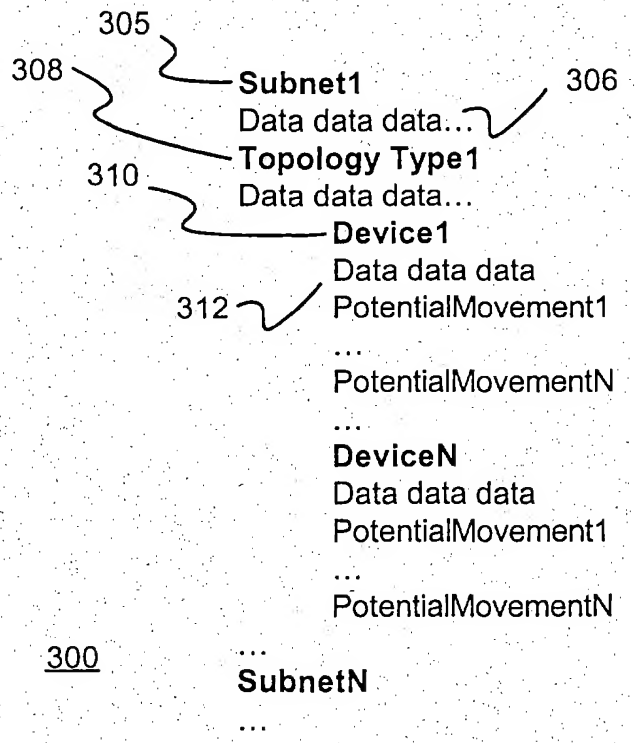
305
308
306
Subnet1
Data data data…
Topology Type1
310
Data data data…
Device1
Data data data
312
PotentialMovement1
…
PotentialMovementN
…
DeviceN
Data data data
PotentialMovement1
…
PotentialMovementN
300
…
SubnetN
…

FIG. 3

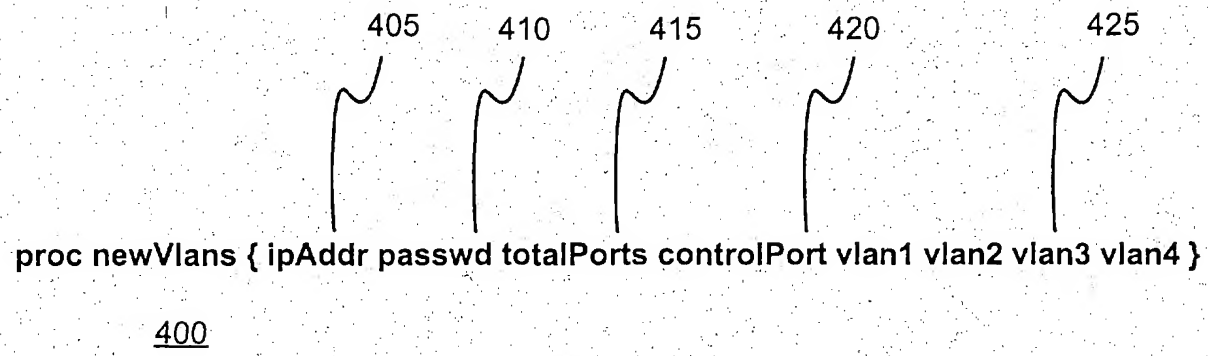
405
410
415
420
425
proc newVlans { ipAddr passwd totalPorts controlPort vlan1 vlan2 vlan3 vlan4 }
400

FIG. 4

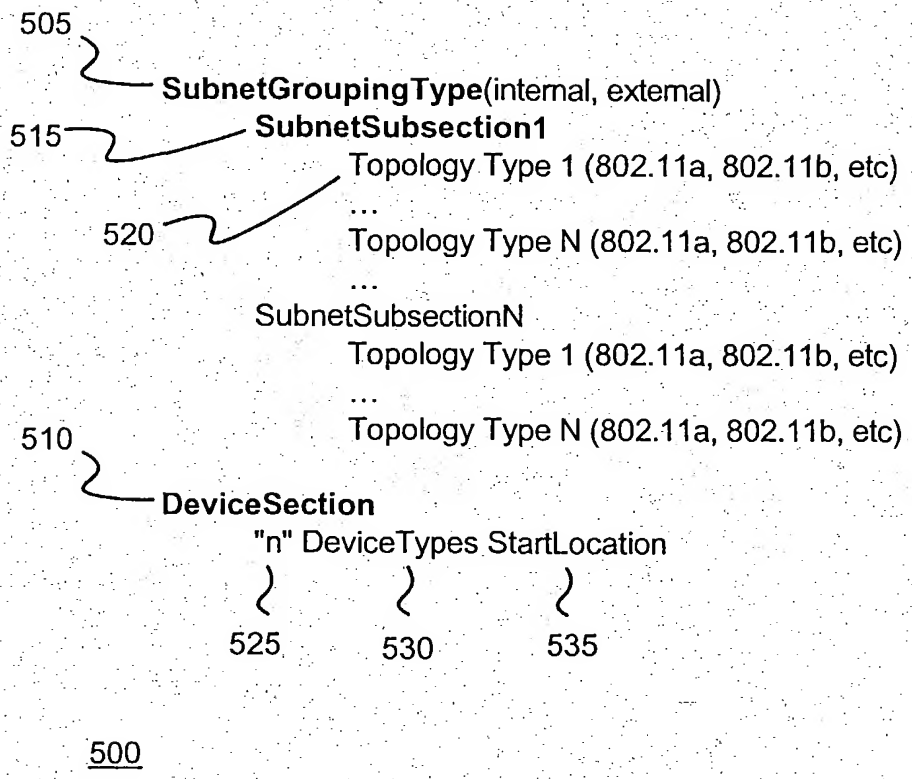
505
SubnetGroupingType(internal, external)
515
SubnetSubsection1
Topology Type 1 (802.11a, 802.11b, etc)
...
520
Topology Type N (802.11a, 802.11b, etc)
...
SubnetSubsectionN
Topology Type 1 (802.11a, 802.11b, etc)
...
Topology Type N (802.11a, 802.11b, etc)
510
DeviceSection
"n" DeviceTypes StartLocation
525
530
535
500

FIG. 5

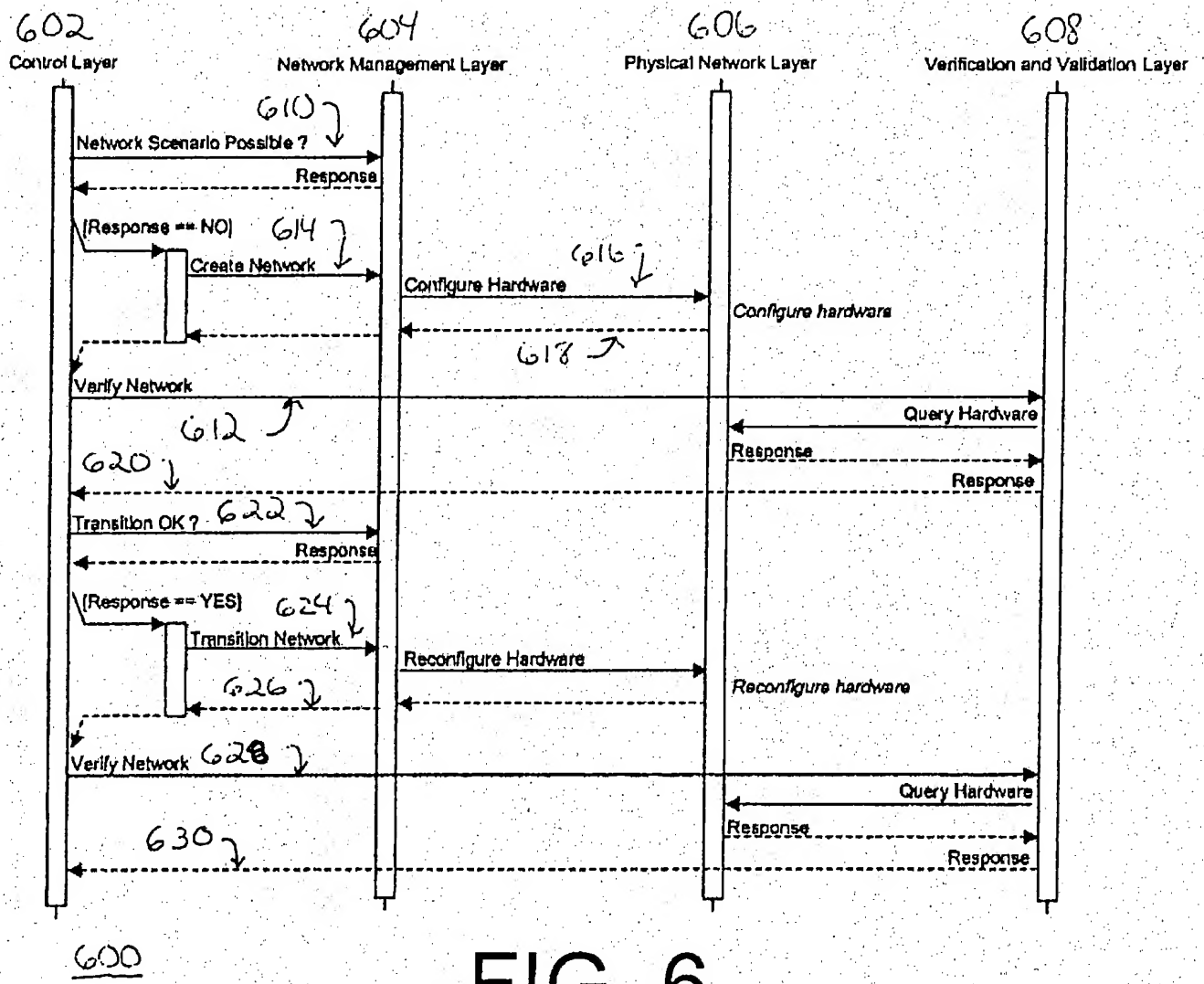
602
Control Layer
604
Network Management Layer
606
Physical Network Layer
608
Verification and Validation Layer
610
Network Scenario Possible ?
Response
(Response == NO)
614
Create Network
616
Configure Hardware
Configure hardware
618
Verify Network
612
Query Hardware
Response
Response
620
Transition OK ?
622
Response
(Response == YES)
624
Transition Network
Reconfigure Hardware
Reconfigure hardware
626
Verify Network
628
Query Hardware
Response
Response
630
600

FIG. 6

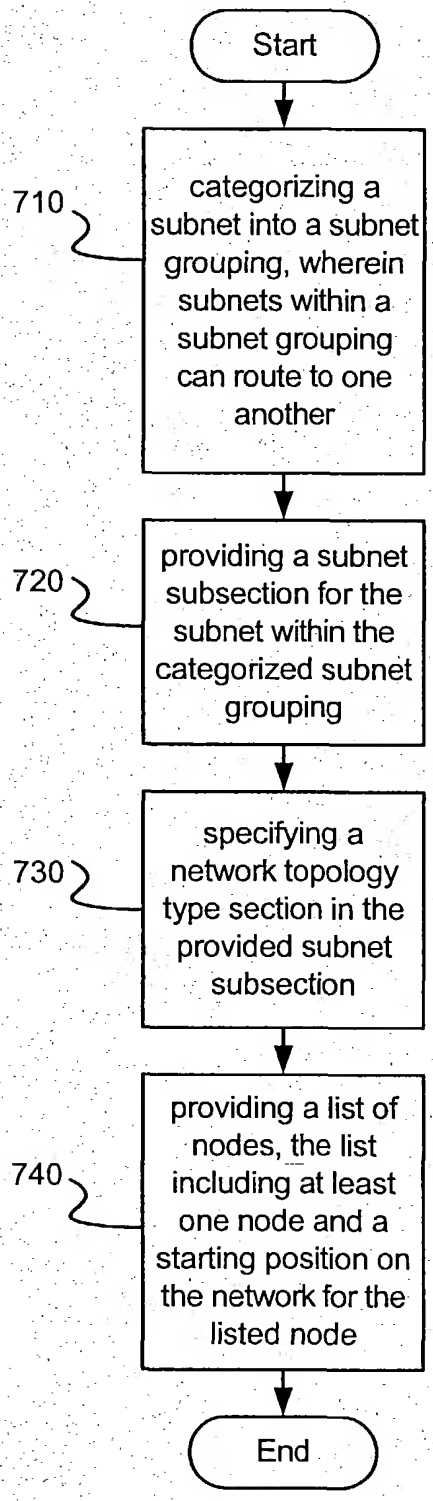
Start
710
categorizing a subnet into a subnet grouping, wherein subnets within a subnet grouping can route to one another
720
providing a subnet subsection for the subnet within the categorized subnet grouping
730
specifying a network topology type section in the provided subnet subsection
740
providing a list of nodes, the list including at least one node and a starting position on the network for the listed node
End

FIG. 7

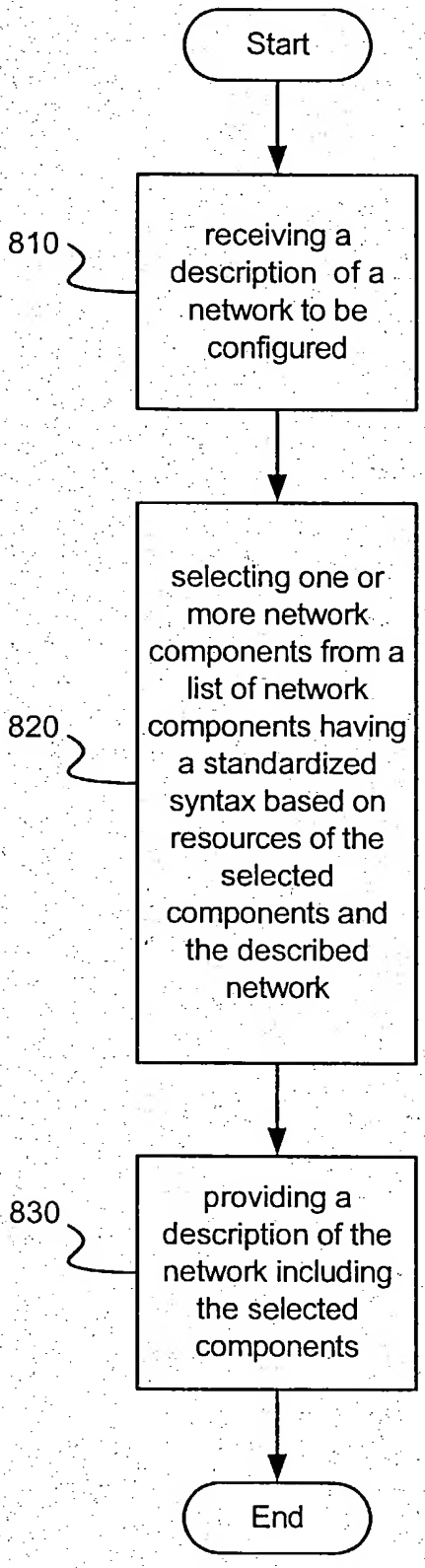
Start
810
receiving a description of a network to be configured
820
selecting one or more network components from a list of network components having a standardized syntax based on resources of the selected components and the described network
830
providing a description of the network including the selected components
End

FIG. 8

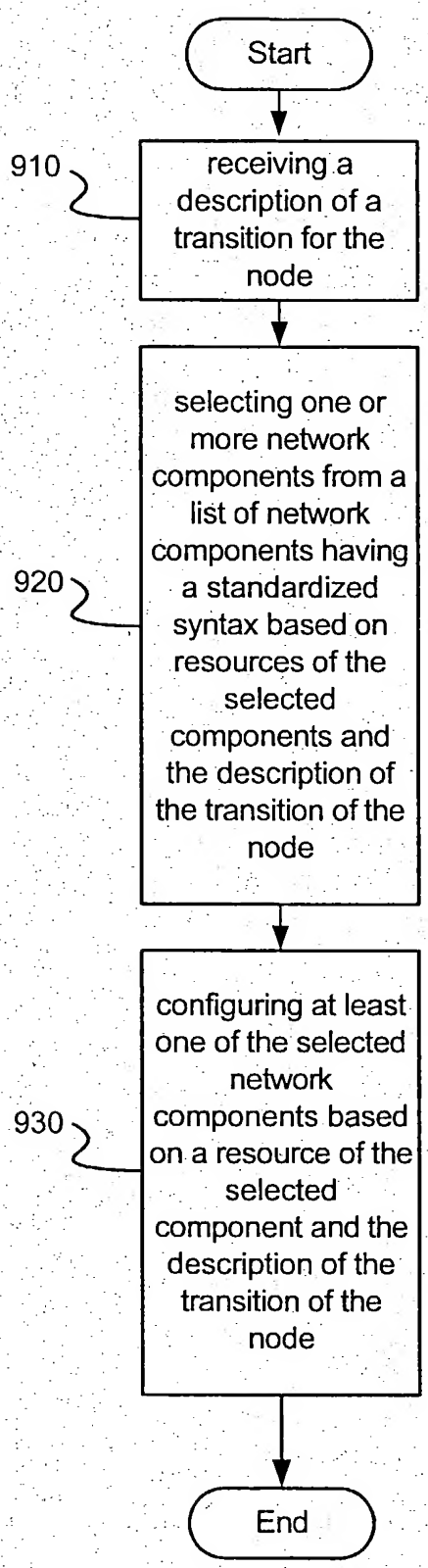
Start
910
receiving a description of a transition for the node
920
selecting one or more network components from a list of network components having a standardized syntax based on resources of the selected components and the description of the transition of the node
930
configuring at least one of the selected network components based on a resource of the selected component and the description of the transition of the node
End

FIG. 9

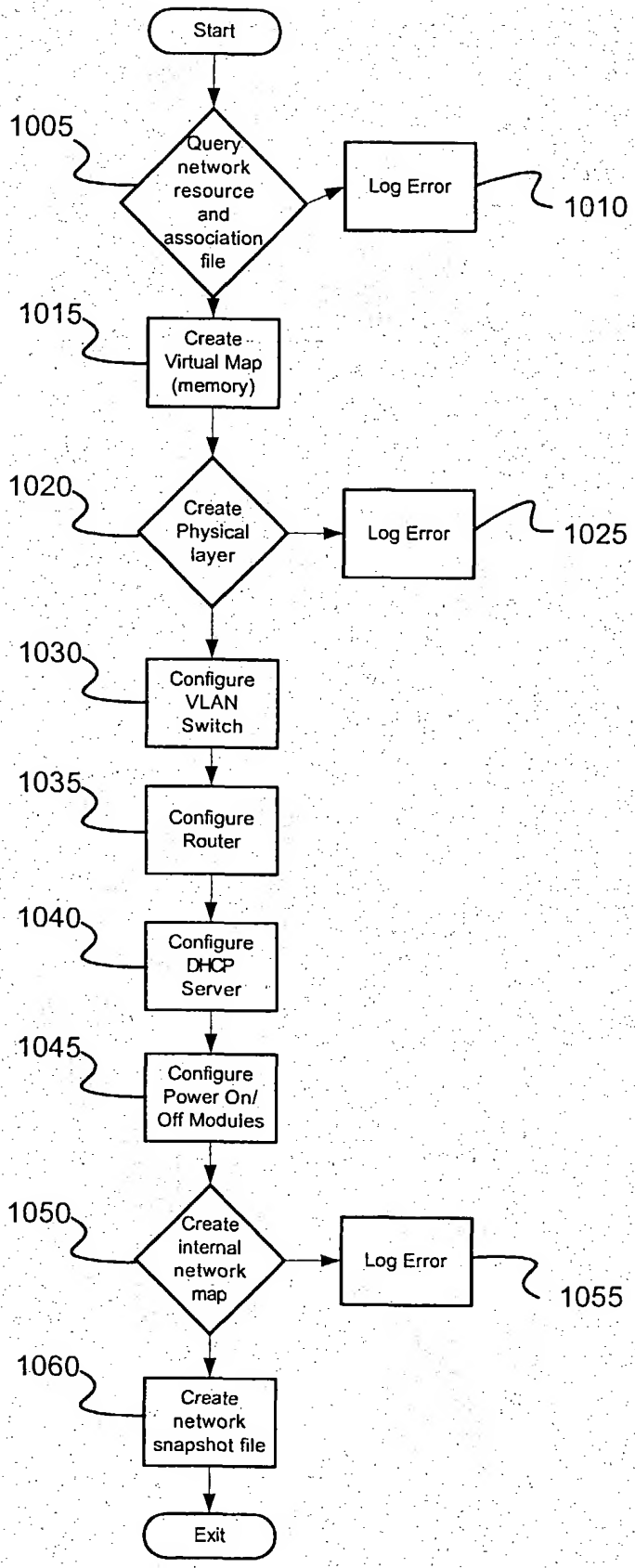
Start
1005
Query network resource and association file
Log Error
1010
1015
Create Virtual Map (memory)
1020
Create Physical layer
Log Error
1025
1030
Configure VLAN Switch
1035
Configure Router
1040
Configure DHCP Server
1045
Configure Power On/ Off Modules
1050
Create internal network map
Log Error
1055
1060
Create network snapshot file
Exit

FIG. 10

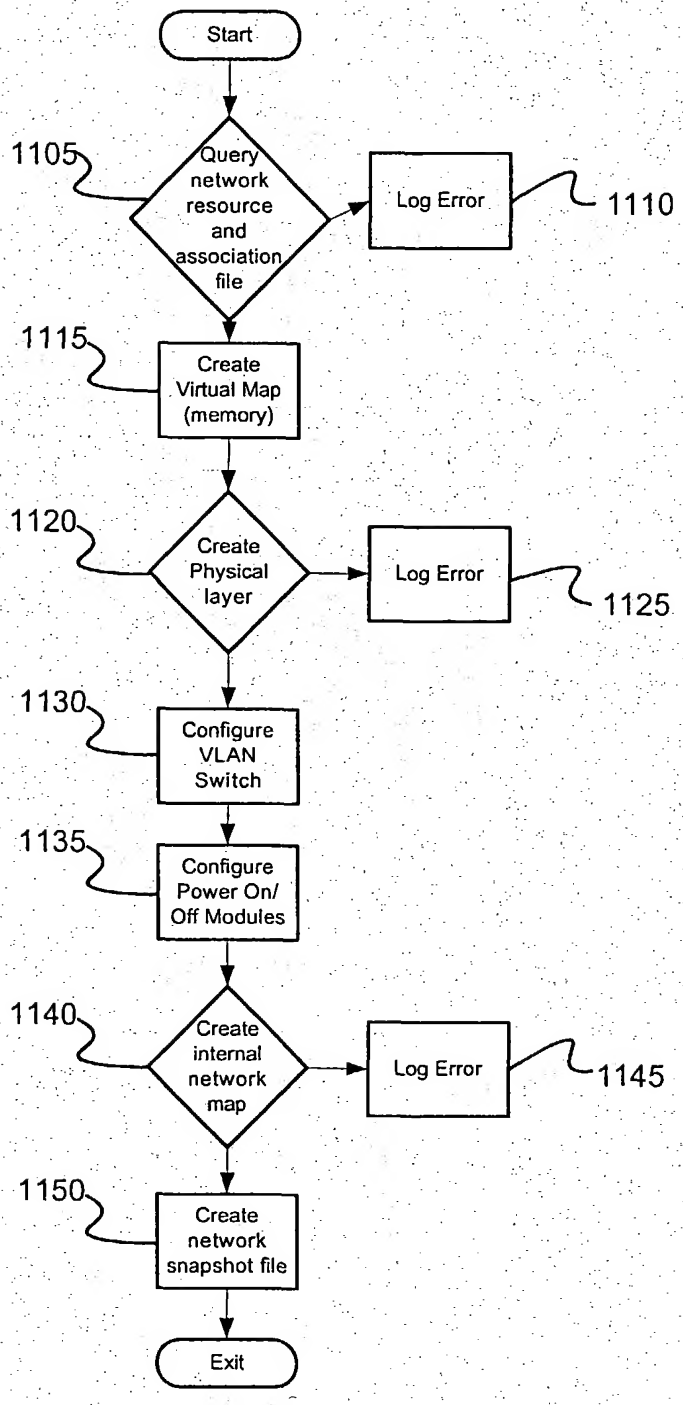
Start
1105
Query network resource and association file
Log Error
1110
1115
Create Virtual Map (memory)
1120
Create Physical layer
Log Error
1125
1130
Configure VLAN Switch
1135
Configure Power On/ Off Modules
1140
Create internal network map
Log Error
1145
1150
Create network snapshot file
Exit

FIG. 11

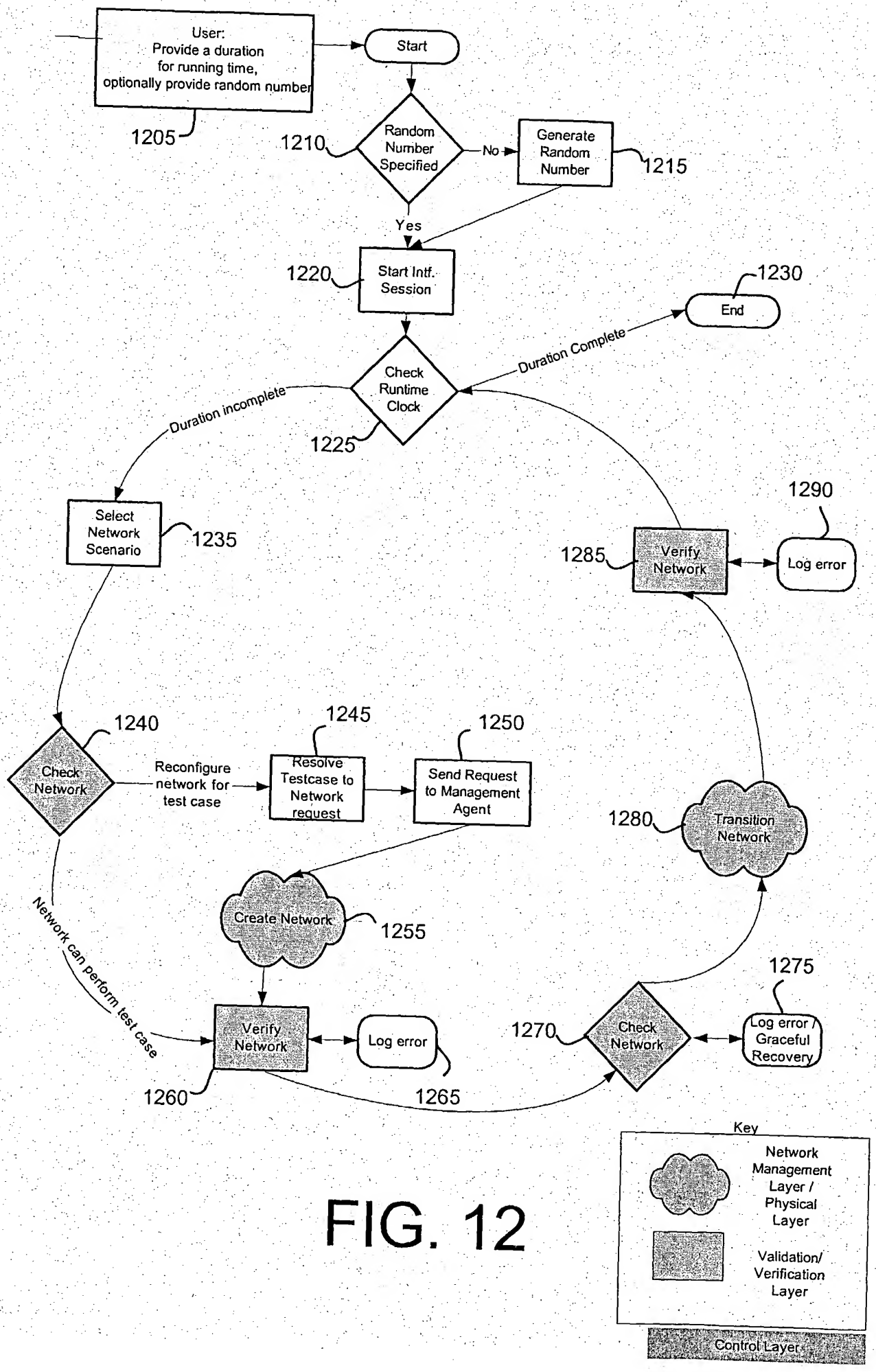
User:
Provide a duration
for running time,
optionally provide random number
1205
Start
Random
Number
Specified
1210
No
Generate
Random
Number
1215
Yes
Start Intf.
Session
1220
End
1230
Check
Runtime
Clock
1225
Duration Complete
Duration incomplete
Select
Network
Scenario
1235
1290
1285
Verify
Network
Log error
Check
Network
1240
Reconfigure
network for
test case
Resolve
Testcase to
Network
request
1245
Send Request
to Management
Agent
1250
1280
Transition
Network
Create Network
1255
Network can perform test case
Verify
Network
Log error
1260
1265
1270
Check
Network
1275
Log error /
Graceful
Recovery
Key
Network
Management
Layer /
Physical
Layer
Validation/
Verification
Layer
Control Layer

FIG. 12

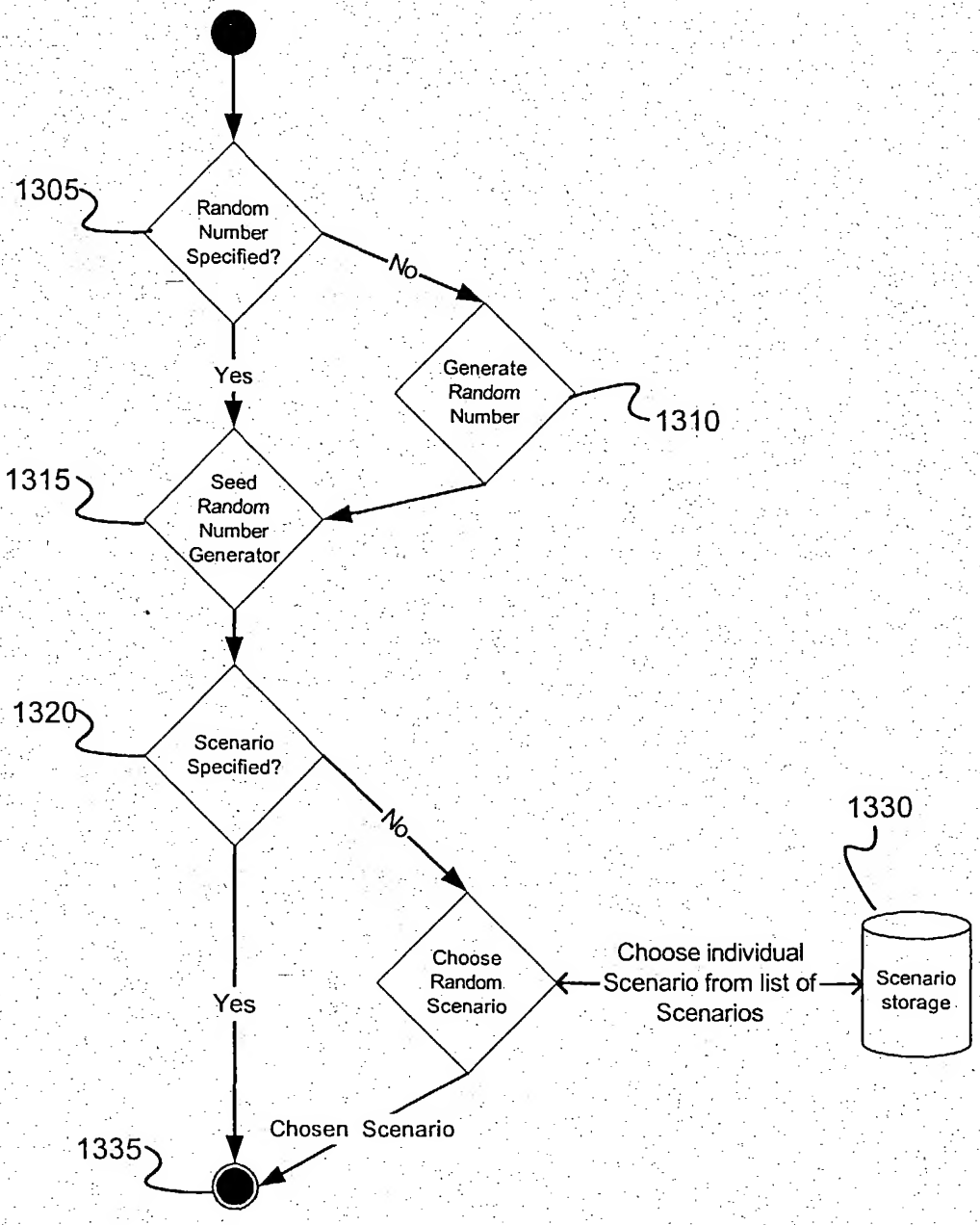
1305
Random Number Specified?
No
Yes
Generate Random Number
1310
1315
Seed Random Number Generator
1320
Scenario Specified?
No
Yes
1330
Choose Random Scenario
Choose individual Scenario from list of Scenarios
Scenario storage
Chosen Scenario
1335

FIG. 13

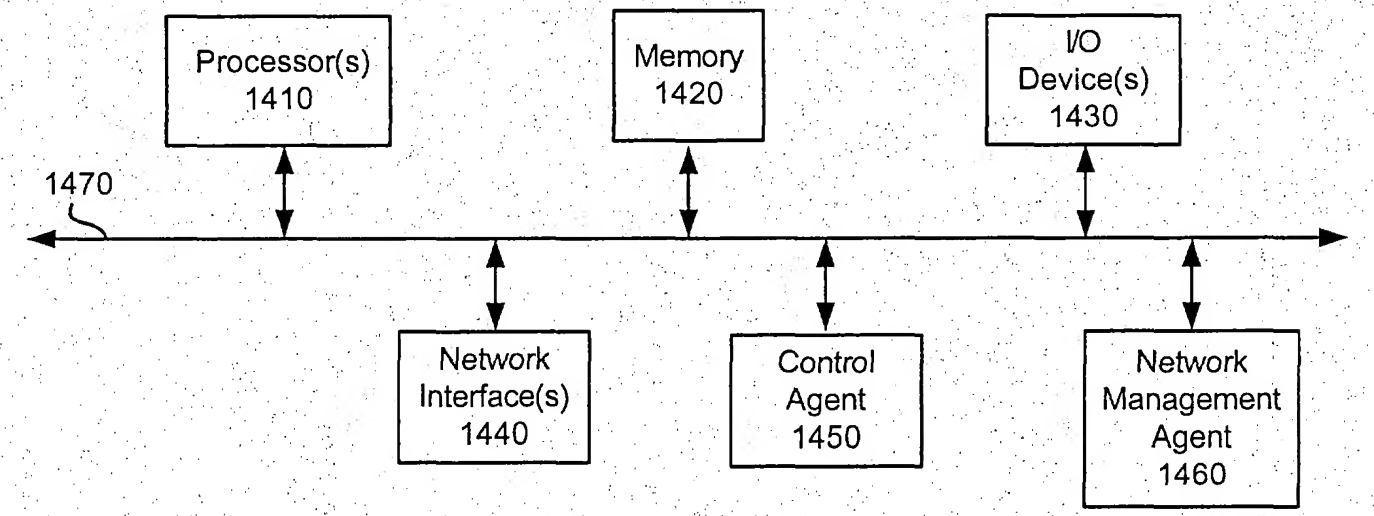
Processor(s)
1410
Memory
1420
I/O
Device(s)
1430
1470
Network
Interface(s)
1440
Control
Agent
1450
Network
Management
Agent
1460
1400

FIG. 14

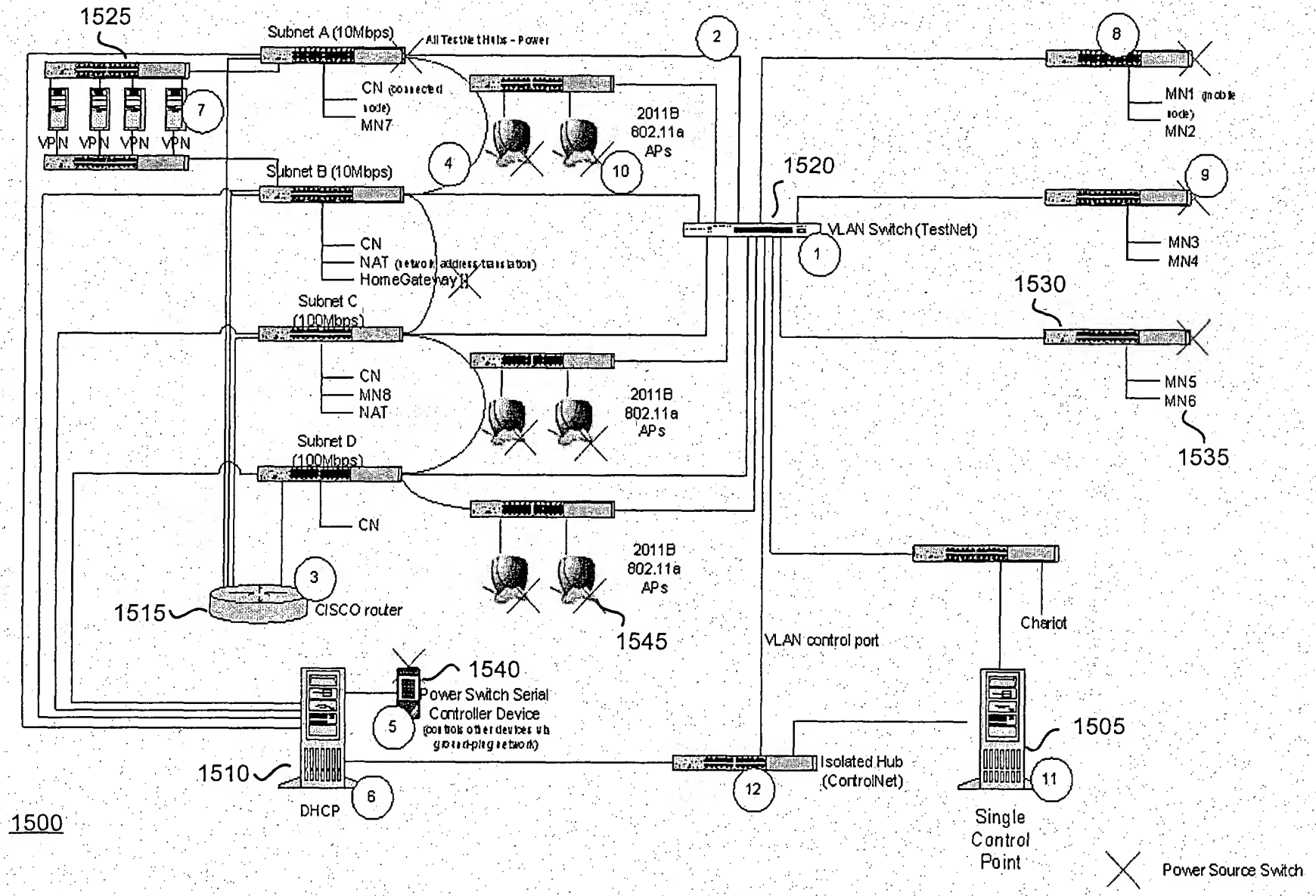
1525
Subnet A (10Mbps)
All Testie t Hnlx - Power
2
8
CN (connected node)
MN7
MN1 (mobile node)
MN2
7
VPN VPN VPN VPN
2011B 802.11a APs
4
10
1520
Subnet B (10Mbps)
9
VLAN Switch (TestNet)
CN
NAT (network address translation)
HomeGateway[1]
1
MN3
MN4
1530
Subnet C (100Mbps)
CN
MN8
NAT
2011B 802.11a APs
MN5
MN6
1535
Subnet D (100Mbps)
CN
2011B 802.11a APs
3
1515
CISCO router
1545
VLAN control port
Chariot
1540
Power Switch Serial Controller Device
(controls other devices via ground-plug network)
5
1505
1510
DHCP
6
12
Isolated Hub (ControlNet)
11
1500
Single Control Point
Power Source Switch

FIG. 15